

PICTURE OF THE MONTH

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The variation in the amount of solar energy absorbed by different types of surfaces is one of the primary causes of great differences in local cloud distributions. Fair weather cumulus, common during the summer, form when warm air parcels rise from the heated land. These convective clouds seldom form over relatively cool bodies of water. Prior to daily coverage by weather satellites, the extent and persistence of this river or lake effect was observed frequently only by those who lived near or traveled over such areas.

An example of the distribution of clouds resulting from differential heating in the Great Lakes area is shown in figure 1. This ESSA 5 photograph was taken at 2054 GMT, (1454 cst) August 4, 1967. Scattered to broken fair weather cumulus prevail over most of the area. Many of the individual cumulus cloud elements along the left side of the picture are too small to be resolved by the camera, and thus give the area a gray appearance. Numerous dark, cloud free regions such as E and F correspond to lakes or swampy areas.

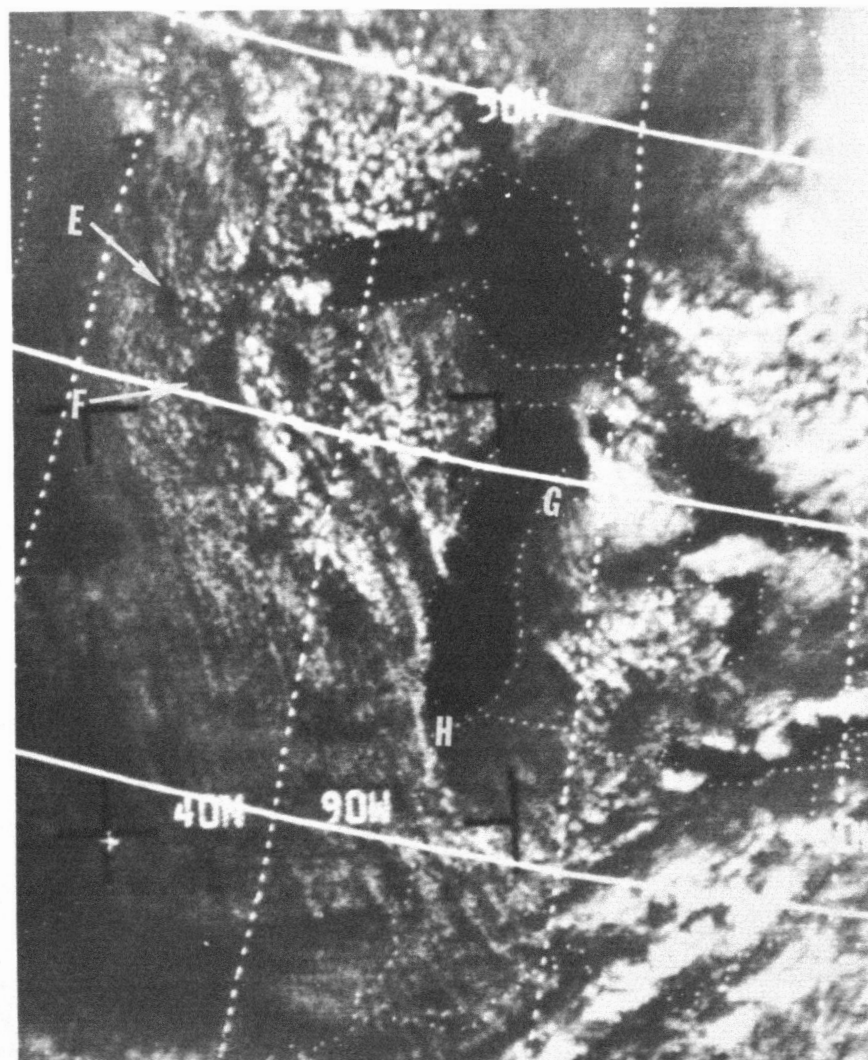


FIGURE 1.—ESSA 5 orbit 1348, frame 5, August 4, 1967, 2056 GMT.

With the exception of Milwaukee, light north and north-west surface winds were reported to the west of Lake Michigan and Lake Superior at 2100 GMT (fig. 2). W. A. Lyons [1] observed that when light winds, as in this case, advect fair weather cumulus over the Lakes the heat sources are removed and the clouds quickly decay through entrainment leaving the Lakes cloud free. The clear area (G, H) immediately to the east and south of Lake Michigan is the result of cool air being blown off the water. As the air is heated from below, the cloud cycle is resumed farther inland.

Rivers affect cloud distribution in the same way but on a much smaller scale.

Also of interest is the distinct line of cumulus clouds north and west of H (fig. 1). At this time Milwaukee reported a southeasterly wind off Lake Michigan. The zone of convergence produced by the cool, moist, lake breeze and the effects of heating over land, cause the air to rise and form the narrow line of cumulus.

Consideration and observation of small thermal effects such as these can be quite important for successful local forecasting.

REFERENCE

1. W. A. Lyons, "Some Effects of Lake Michigan Upon Squall Lines and Summertime Convection," *SMRP Research Paper* 57, University of Chicago, May 1966, 22 pp.

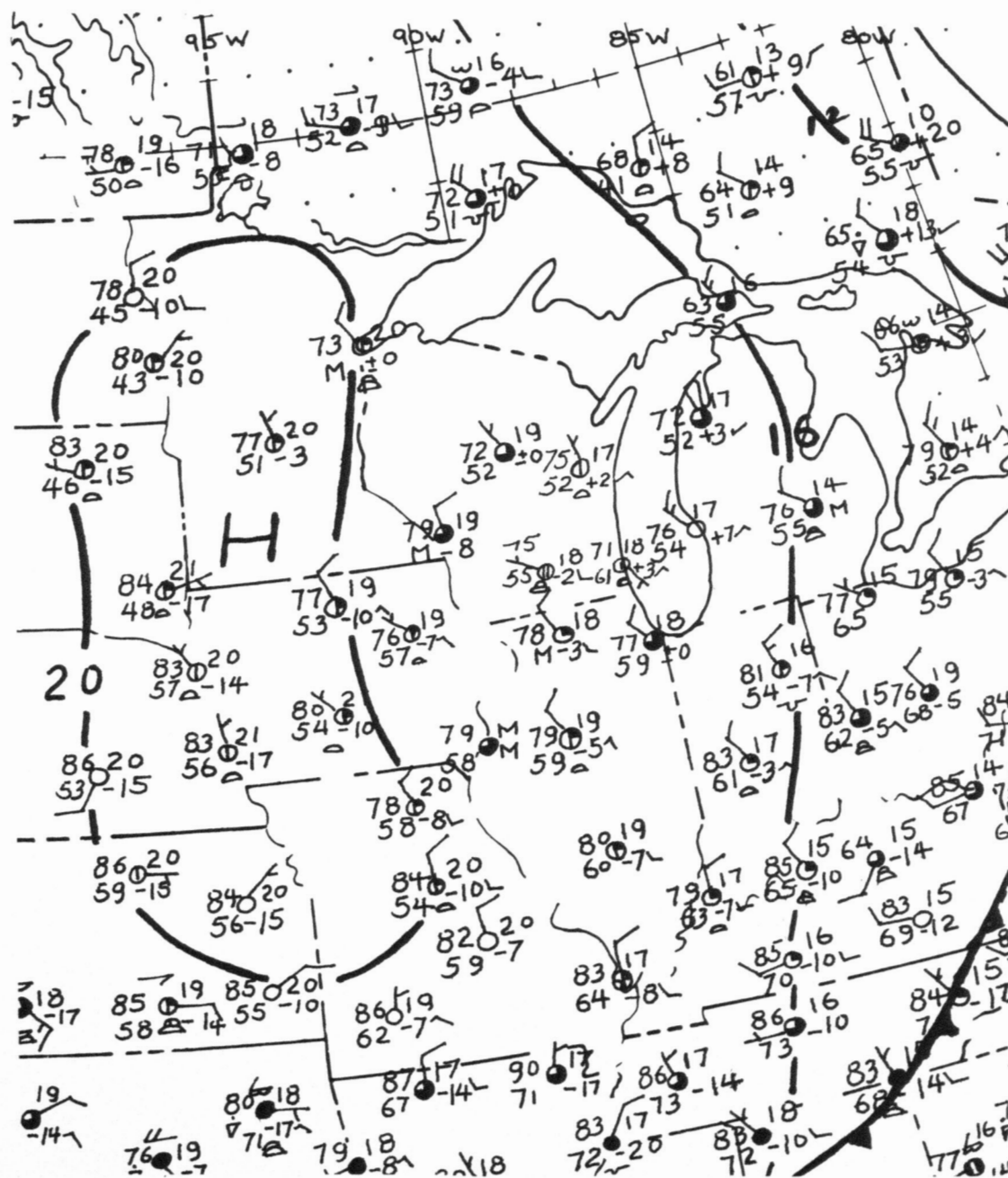


FIGURE 2.—Surface map 2100 GMT, August 4, 1967.